MINISTRY OF AGRICULTURE, LIVESTOCK, FISHERIES & COOPERATIVES

ASDSP
AGRICULTURAL SECTOR DEVELOPMENT SUPPORT PROGRAMME

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Global Partnership for Sustainable Development Data

Real-time Agriculture Data for COVID-19 Response in Kenya

Lessons to build the case for more and better financing for agriculture data

In early 2020, the COVID-19 pandemic exacerbated an existing food insecurity crisis in Kenya by limiting the free movement of people and goods locally and internationally. The immediacy of lockdown protocols to curb the spread of the pandemic also meant limiting the regular flow of and access to food. However, to understand the extent of the crisis, policymakers needed to know how much food was available and where in a timely manner.

Maasai Mara Trips Kenya, Nairobi City, Kenya
Credit: Pop & Zebra

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Summary

A team of data experts comprising government and non-government volunteers came together to co-create data driven solutions that enabled the Ministry of Agriculture to have access to reliable and accurate data on the availability of food staples in all the 47 counties. The team rapidly configured ESRI's custom off the shelf technology and deployed a mobile-based survey (Food Staples Survey) to collect data on available food stocks from stockists, farmers, traders, aggregators, and other agricultural food operators across all of Kenya. Once collected, the data was aggregated in a Food Staples Dashboard, available to members of the Food Security War Room (FSWR), the Ministry of Agriculture, the Agriculture Sector Development Support Programme (ASDSP II) staff as well as members of the public. This led to the development and dissemination of concrete and actionable food availability guidelines that were rolled out across the country.

> **"Previously, information on food systems risks were anecdotal and in silos. It [the data collection exercise] increased the visibility of the number of value chains that are affected by COVID-19. The protocols were so vague, before. Data enabled us to develop our protocols in a more defined manner and targeting different sub-sectors in agriculture."**
>
> **— Ministry of Agriculture Livestock Fisheries and Cooperatives**

This exercise provoked thought and reflection on how government can and should coordinate data collection, access and sharing across the agriculture ecosystem and truly transform the agriculture sector. Two core issues stood out:

1. Transforming the access to agriculture data needs better coordination and lesson sharing. This helps to embed a data driven approach and build a culture of data production and use.

2. Transforming access to agriculture data needs more and improved financing, especially through domestic government funding. This is a key ingredient to allow prioritized investment in foundational/core systems to allow building of innovative solutions.

Leveraging existing systems for innovation

Kenya's Agriculture Sector Transformation and Growth Strategy (ASTGS) 2019-2029 commits to ensuring that agriculture data is available, usable, timely, and interoperable. It recognizes the importance of having both traditional data such as censuses and surveys in addition to other innovative data sources.

The need was further exacerbated with the COVID-19 pandemic. The government needed to make decisions in real time and needed accurate, reliable, and timely data for these decisions. With a reliable network of stakeholders and existing partnerships in the agriculture sector, the government looked to existing systems, institutions, and networks to mobilize action.

The FSWR was established to rapidly support Kenya's COVID-19 response and ensured that despite the pandemic, three key objectives (all guided by reliable and timely data) were met:

1. Ensure the availability, accessibility, and affordability of food and water (e.g., maintain flow of produce to markets including imports, minimize disruptions to market operations, and monitor price volatility of food)

Malindi's Market, Kenya
Credit: Francisco Marques

2. Support subsistence farmers, livestock farmers and fisherfolk (e.g., maintain availability and affordability of inputs, mitigate impact of the locust invasion)

3. Maintain agricultural output and value addition (e.g., support operations of large farms and processors, and limit disruptions to markets including for export)

To propel the FSWR, stakeholders in the agriculture sector organized themselves and created a forum for experts to brainstorm and advise the government on the most appropriate solutions. From the onset, there was concurrence that the country did not have reliable information on available food stocks. While the national government and counties (sub-national governments) collect information on the food balance sheet on a regular basis through the Digital Food Balance sheet data on the food balance sheet across the East African region is viewed as unreliable, yet a large proportion of the population is constantly food insecure.

The FSWR posited that accessing information on the current food stocks would be their number one priority to guide their decision making.

A resilient system: A key success factor

The overall factor that led to the success of this exercise, was the resilience and readiness of the Ministry of Agriculture Livestock Fisheries and Cooperatives (MoALFC). The use of existing mechanisms meant that these could be deployed at short notice using systems that are stable and robust, and players who were able to work in a coordinated effort.

- The Agriculture Sector Development Support Programme II (ASDSP II): The programme provided an *existing mechanism* for mobilizing and coordinating value-chain actors at the county level, and submitting the data verified by county government officials to the national government. With the programme already in operation in all 47 counties, this meant that there were resources (human and financial) to deploy this work, with a well-established mechanism for sharing information

between the national and sub-national governments and with key stakeholders.

- ESRI already had *existing solutions for data management, data visualization through dashboards as well as data collection* through the ArcGIS for Survey123 app that were possible to configure in a short time frame. Together with the support of other players, and as part of its COVID-19 disaster response program, ESRI was able to offer free licenses to the government to enable this exercise. The choice of a geospatial platform would enable understanding location differences and also signifies that this solution can be used in future and can be regularized.

- The MoALFC had an *existing relationship* with ESRI making mobilization easier.

- There was a *'ready' network of stakeholders* who were able to provide technical and practical support to ensure this worked. Key industry leaders were convened on a WhatsApp group (the Joint Agriculture Action Group-JAAG), where daily progress was monitored and specific organizations called upon to provide technical and other kinds of support.

The solution

To enable timely data collection in all the 47 counties, a team to execute this assignment was availed by the ASDSP II. This program's Monitoring and Evaluation (M&E) officers, who are present in all the counties and have existing national coordination mechanisms as well as solid linkages with the county governments, were engaged. The data was to be used in designing strategies to support the efforts of the FSWR during COVID-19 and to guide ASDSP II in their subsequent projects.

The M&E officers and programme coordinators were virtually trained by ESRI on the mechanisms of implementation of the survey. These M&E officers identified their enumerators at the county level and trained them virtually too.

Data collection exercise commenced on on May 4th, 2020 and ended on June 25th, 2020. In less than two months, data on the availability and pricing of food staples was available for the entire country.

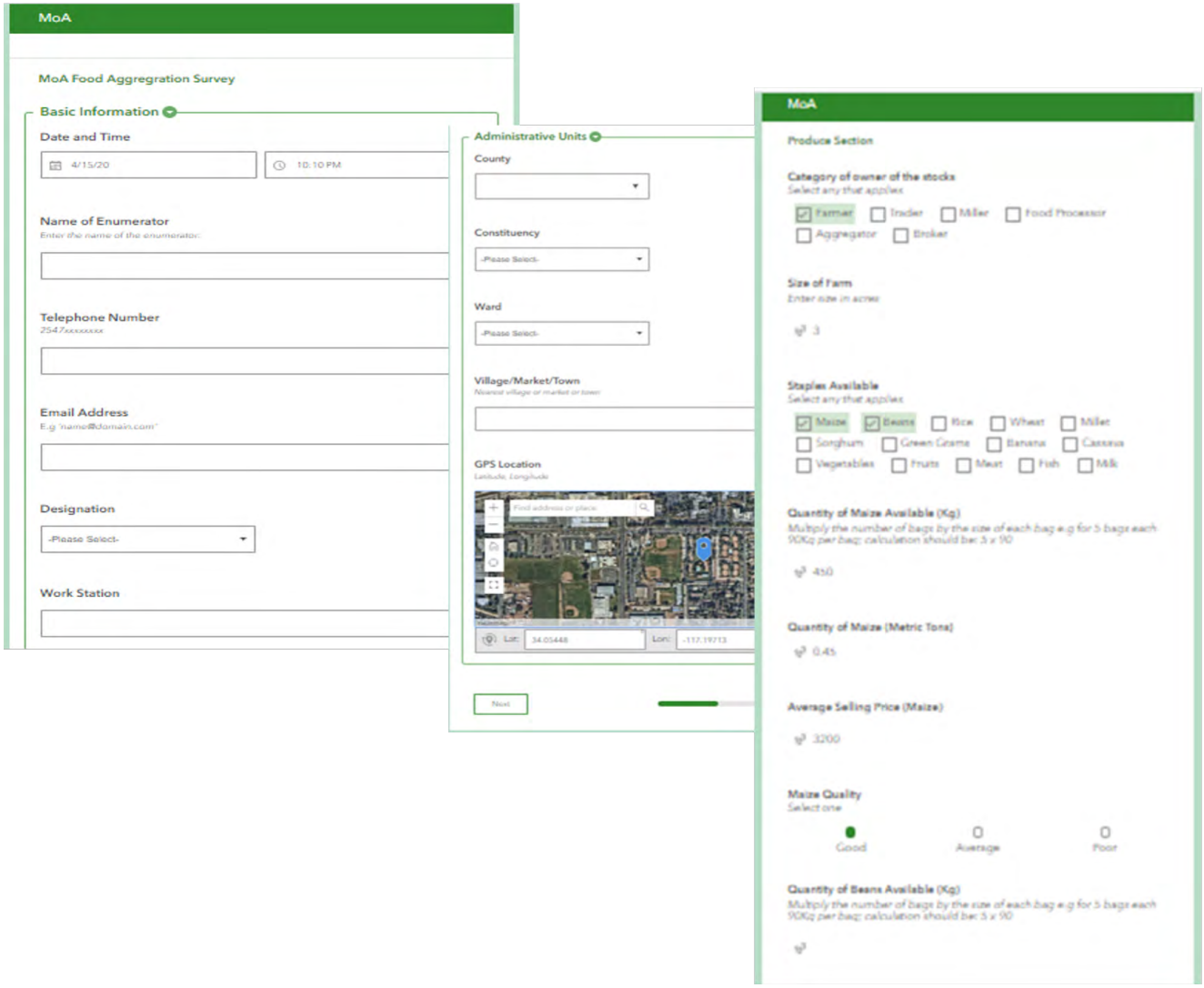


Figure 1: ArcGIS Survey123 interface for data collection

Table 1: Key players that supported this process

Organization	Role Played
Ministry of Agriculture, Livestock, Fisheries and Cooperatives (MoALFC)	**Enabler:** As the Chair to the County Government Co-ordination & Food Supply Working Group, the Cabinet Secretary launched the FSWR and a Hotline and convened weekly meetings to monitor food availability. The Ministry issued a directive to enable programmes to align resources to enable the collection, verification and submission of data. State of Food-Security reports were issued with regular press briefings to address bottlenecks to the free flow of food and agricultural commodities, communicate Government protocols and guidelines while correcting rampant misinformation from the public. Agricultural services were declared essential, and exception passes provided by the Agriculture and Food Authority to facilitate movement during lockdown and curfew.
County Government Coordination & Food Supply Working Group	**Decision Maker:** Comprised of the MoALFC, Devolution and ASALs, Water and Sanitation and Lands & Physical Planning; and the Council of Governors was responsible for receiving the data at the National level to inform Cabinet and the President to make decisions on the Food Security preparedness, and to facilitate decisions to keep the food system operational and ensure national food security even in a full-lock down scenario. Inter-ministerial coordination at this level also facilitated quick decision making and synergy in support of food and water availability and distribution. Challenges on coordination or technology adaption in using the app at the county level were reported to this committee and addressed.
The Agriculture Transformation Office (ATO)	**Data User:** ATO coordinated the FSWR and was a key consumer of the data. It provided an enabling environment through governance, the legal mandate and utilized other Ministry agencies such as the Kenya Agriculture & Livestock Research Organization (KALRO). The ATO then took over the management and sustenance of the FSWR.
Kenya Agriculture & Livestock Research Organization (KALRO)	**Solution Supplier:** Co-developed the app with ESRI team and facilitated training for County M&E officers and host the data on their Big Data platform.
Council of Governors	**Enabler and Facilitator:** The Chair of the Agriculture Committee oversaw the establishment of County Food Security War Rooms and the Chair of the County Executive Committee (CEC) Caucus was a member of the FSWR, where they actively ensured that county governments were fully engaged and facilitated to undertake the food monitoring activities.
County Governments (Especially CECs)	CECs Chaired Committees in charge of data validation at the county level, and facilitated the submission of data to the CoG and MoALFC.

Agriculture and Rural Development Donor Group	**Enablers:** Supported the initiative by providing technical support and providing input to ensure the app developed into a sustainable platform, to ensure it would be embedded within the Ministry's human infrastructure. The donors also opened up window-of opportunity avenues for their ongoing projects to support the data collection and food availability surveillance activities in counties of their operation, and received monthly updates on the progress from the Principal Secretary.
ESRI	**Solution Supplier:** Deployed their ArcGIS skills, trained Ministry of Agriculture, provided free licenses, managed the data and dashboard and ensured privacy and confidentiality of the data collected.
ASDSP II	**Enabler, Data Producer and User:** Provided M&E officers across the country to lead the data collection and a Communication Officer at the National FSWR. Also found value in the data collected as it informed their next project phase. Funding for this activity was supported by NIRAS.
Thunderbird School of Global Management (Arizona State University)	**Connector:** Brought all these players together to work on a solution for the FSWR.
Global Partnership for Sustainable Development Data and SustaiNet	**Coordinator:** Ensured all these players worked together to deliver the project.
Microsoft	**Sustainer & Champion:** Saw the opportunity to sustain and support the Ministry of Agriculture post-COVID19 and support data systems for longer.
McKinsey	**Amplifier:** As McKinsey provided analytical support to the FSWR, they used the data from the Food Staples app to advise government.

> **"I wish to thank the ASDSP II team for the dedication and support for this initiative. This is going to be a major learning curve in the efforts towards improving agricultural data collection. The success of this initiative will inform the beginning of real time national and county data collection and reporting. Let's all document observation and lessons for further use."**
>
> **— MoALFC**

What did the data show?

A total of 26,134 respondents were reached during the survey over the two months. On average, each county collected information from 556 respondents. All the data was collected and aggregated in a Food Staples Dashboard, which provides analytics by staple, quantity, price and the location and geographic distribution of the produce.

In Figures 2 and 3, the prices of some staples changed significantly in the two months. For example, the price of maize, rice, and green grams rose significantly indicating a high demand for these products. Given that households were feeling the effects of the pandemic on the economy, these staples were becoming popular as they were affordable, but this was also affecting its supply and prices.

A snapshot of two counties as shown in Figures 4 and 5 also provides sub-national situation analysis on food availability and pricing. In Nairobi for example, being the capital city, food was readily available. In Nandi county, food prices were quite fair compared to available quantities. While it may not be possible to compare across counties because of context specific differences, these sub-national snapshots guided the decision makers at the county level.

Figure 2: National food prices changed within the two months of data collection (phase I)

Figure 3: National food prices changed within the two months of data collection (phase II)

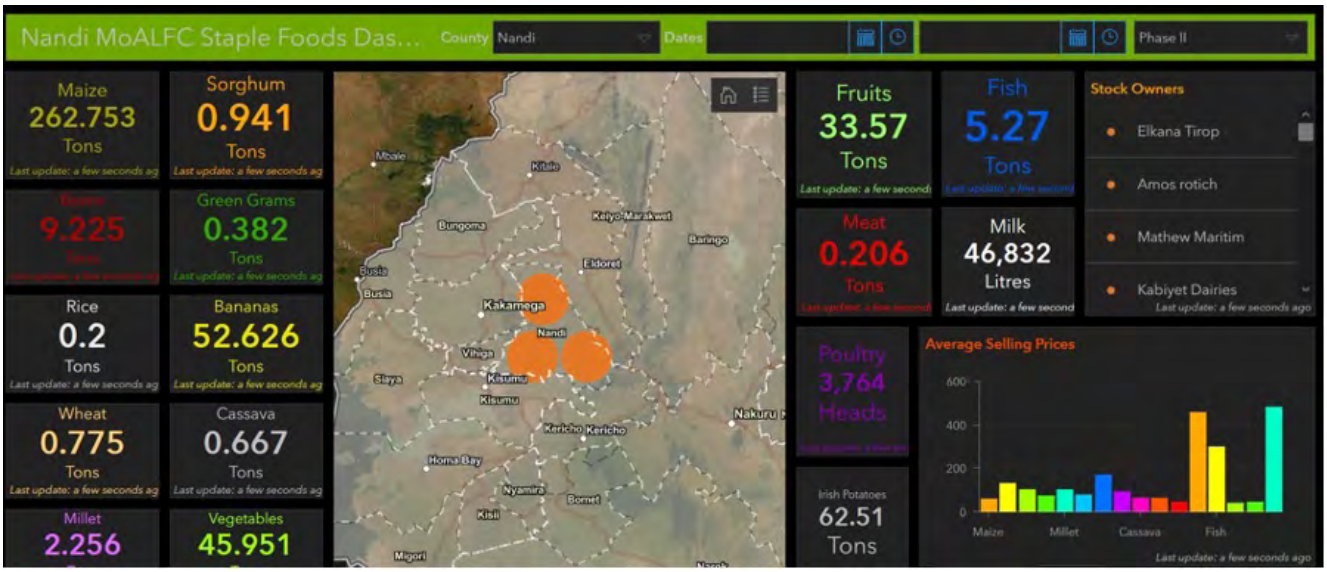


Figure 4: Subnational variation in the availability and prices of food stocks for Nandi county using ArcGIS dashboard

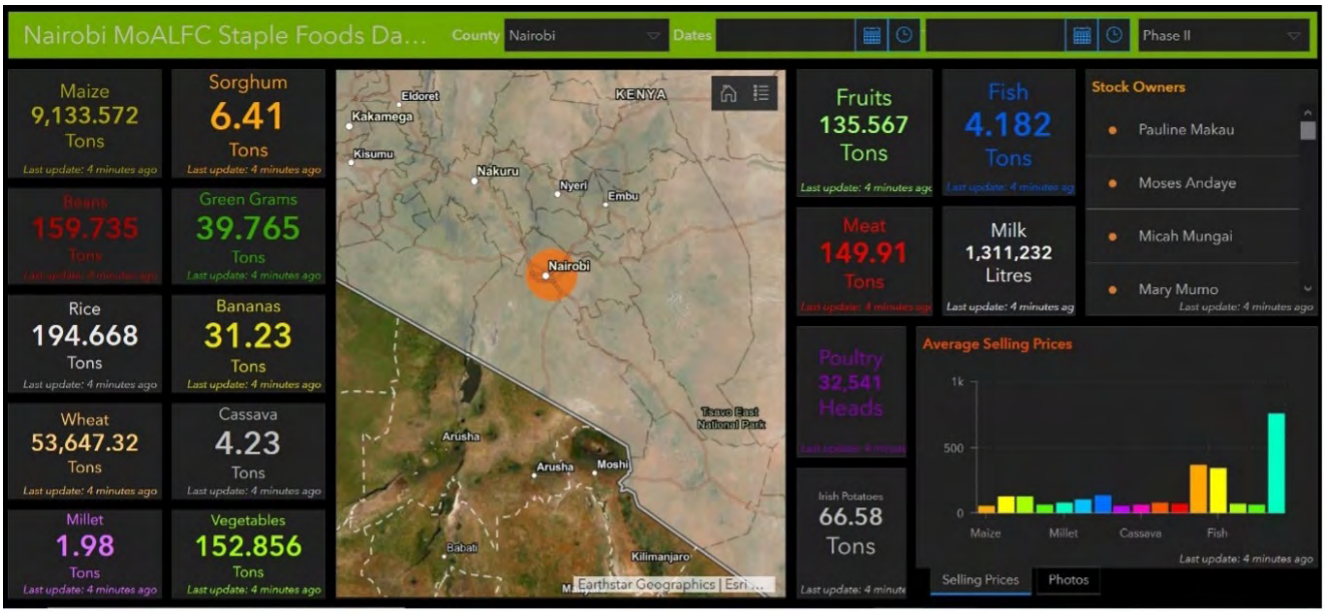


Figure 5: Subnational variation in the availability and prices of food stocks for Nairobi county Using ArcGIS dashboard

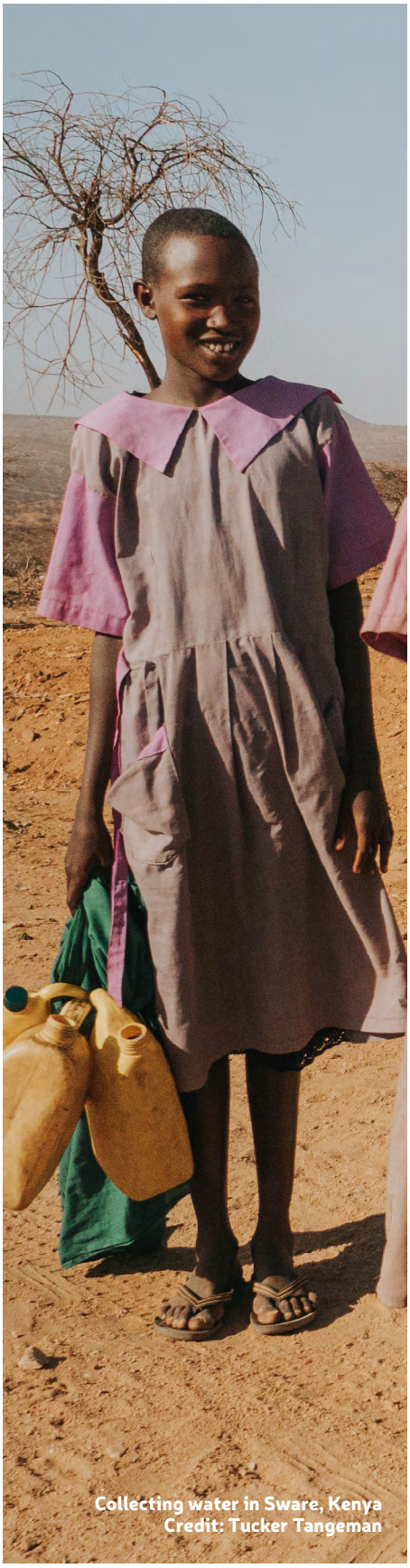
Impact: Decisions made using the data

I. **Guidelines on food availability and food prices:** With the up-to-date data collected, the Ministry of Agriculture was able to develop guidelines on food availability and food prices that were rolled out across the country. The guidelines provided protocols for managing food availability and guidance on the recommended food prices for the various commodities. Among other things, the protocols included:

1. Encouraging county governments to continuously sensitize the workforce on the need to sustain food supplies in various markets on COVID-19 to prevent panic and enable them to perform market functions in the long run.
2. Suspension of market access charges for three months to cushion food stockists.
3. Encouraging food suppliers to adopt e-commerce to minimize contact and to allow households in urban areas to access food.
4. As an early warning mechanism, food distributors were encouraged to share with the government any price volatility or food rationing.

II. **Improving two-way communication between the government and the public:**

1. With accurate data, the Ministry was able to frequently equip the media with accurate information and detailed analysis to inform the public on the availability and access of food, agricultural services and commodities. This was crucial in minimizing speculation and public misinformation as specific bottlenecks to the food system were openly highlighted, alongside respective actions undertaken by both levels of government. The public was also updated when problems were solved (e.g., re-opening of markets, reduction of food prices).
2. A Food Security Hotline to respond to urgent enquiries from stakeholder and members of the public was set up. In the initial days, most calls to the hotline raised concerns over access to market during the lockdown of the capital Nairobi and its neighboring counties, and Mombasa in the coast, by farmers and agricultural vendors and to report on problem areas that needed the attention of the FSWR (e.g.,



Collecting water in Sware, Kenya
Credit: Tucker Tangeman

corruption by traffic police, misinterpretation of COVID-19 agricultural markets' guidelines and protocols).

3. The private sector and other key stakeholders had an opportunity to query data (specifically data on food quantities and prices) and to raise concerns where there was doubt through the FSWR weekly meetings. These were addressed by both national and county government officials.
4. Avenues for leveraging resources were identified by development partners, who made efforts to adjust/align programme budgets to address food system issues highlighted in the weekly reports. For instance, the World Bank projects joined the ASDSP II to support data collection efforts and verification efforts in counties, enabling the food balance sheet to cover more value chains.
5. A One-Million Kitchen Gardens Campaign was launched to address the shortage of fruits and vegetables in urban areas. This government-led campaign was designed to educate the public on the importance of maintaining a balanced diet during the COVID-19 pandemic and on inexpensive methods of producing and preserving vitamin-rich foods in their homes

III. Data was used by County War Rooms to determine areas of food deficit and surplus, and trigger distribution of relief food.

IV. Extension staff used the data to determine and inform value chain actors on opportunities for trade.

V. The success of the system has informed programme and projects on areas to consider on market information, key in point, Kenya Cereal Enhancement Programme Climate Resilient Agricultural Livelihoods Window (KCEP-CRAL) and the Kenya Climate Smart Agriculture Project (KCSAP) which have now developed comprehensive data systems within their scopes.

Market in Lamu, Kenya
Credit: Photos by Beks

> "By August 2020, ~185 issues directed to the hotline (0800 724 891) have been resolved."
> — FSWR August 2020 Bulletin

> "The data enabled us to know that there is a great disparity between national and county governments, and we are able to know what exactly the challenges were. E.g., availability of enumerators, devices to collect information and digital tools for collection of data."
> — MoALFC

For ASDSP II, who were instrumental in the delivery of this activity, this data was instrumental in planning the next phase of their project.

> "This was a great opportunity for the programme to be entrusted by the Ministry to collect and share data on available surplus food stocks in all the 47 counties during this COVID-19 pandemic period and beyond. This enabled us to harness the capacity and experience among various actors to collaboratively collect and share data in real time between the national government and county governments"
> — ASDSP II

What next: Transformations for strengthening agriculture data post-COVID-19

The Food Staples Survey demonstrated some key lessons for government and other agriculture stakeholders. It enabled government to rethink how data can and should underpin agriculture transformation and what it would take to do this.

A. Transforming agriculture data through better coordination and lesson sharing

This exercise initiated a conversation on how the country can truly transform the agriculture sector's data systems and the importance of a geospatial infrastructure. This should inform the government for the years to come, as it works to align and strengthen its data systems and transform the Agriculture sector, and to realize the goals outlined in the 10-year ASTGS. The MoALFC is keen to sustain these lessons, and to consolidate and map all the efforts on agriculture data so that this is coordinated and allows for better partnerships and build a data-use and share culture among stakeholders. This is a role that the ATO - under Flagship 8 of the ASTGS – is mandated to lead on.

The FSWR has now transitioned to a Food Security Monitoring Committee (as envisaged in the ASTGS) to ensure continuous surveillance on food affordability, accessibility, and availability. This requires appropriate funding and policies, and the momentum needs to carry on beyond COVID-19. The government needs to be able to sustainably support its ministries, departments, and agencies to collect and use data and information for decision making by investing in domestic finances for data. Sustaining these activities requires a mix of skills, culture shift, resilience, and adaptive capacity[1], to create an enabling environment that fosters partnerships to strengthen the access and use of correct and timely data in the sector.

B. Transforming agriculture data needs more and better financing

The government through the ATO is committed to building and consolidating digital tools and building skills as it moves into operationalizing the ASTGS. While the challenges exist, the government understands that for more and better resources to be channeled to agriculture data, government structures and policies would need a rethink. For example, current financing to Ministry of Agriculture should have a dedicated line item for agriculture statistics. In addition, more and better funding should be channeled

[1] Agility to work with multiple stakeholders, strong internal systems that can accommodate the influx of tech and data tools and solutions particularly during a crisis

A woman selling maize in Kiambu, Kenya
Credit: Elphas Ngugi

> "The ATO is keen to consolidate all the lessons learned from previous interventions so that it moves beyond the implementer and the donor and become meaningful and accessible to everyone in the agriculture data ecosystem."
> — MoALFC

to traditional data such as surveys and censuses as they would form the foundation for innovation and digital tools.

Innovative methods of financing need to be explored such as index insurance, public private partnerships to allow for through-flow of innovations to and within government and realigning of domestic budgets towards creating a robust digitally enabled workplace.

> "The digital food balance sheet was initially collecting information on maize, now the Ministry is keen to expand to other 12 value chains across 256 markets in the country through the Kenya Climate Smart Agriculture Project (KCSAP) Market Information App. We need to be able to make sure that this is managed and sustained."
> — MoALFC

> "The bottom line about data for agricultural sector is having a structured and sustainable funding approach to meet the need for data collection, analysis and sharing. Data is a social good. The challenge is for the government to make this a national priority with a long-term view to having a structured approach to data management, while at the same time engage donors for short-term seed funding for capacity building, systems development, etc."
> — MoALFC

Conclusion

The COVID-19 pandemic accelerated the data revolution globally, and Kenya's agriculture sector was not left behind. As governments needed accurate, real time information to make decisions about people's livelihoods, the government of Kenya was able to take advantage of existing mechanisms, solutions, and networks to generate and use data for decision making on food security. This demonstrated a resilient system, but it also posed as a learning point for the government.

To truly transform the sector's data needs will require deliberate action. Two ingredients are key: better coordination of the players and systems in the country and more and better financing for agriculture data.

As the country moves into the post-COVID-19 era, measuring the impact of these lessons would be important. The Ministry of Agriculture understands what is needed to fully transform the sector and the data generated in the sector. As the ATO becomes fully operational, this understanding, lessons, and experiences would be put to test. ATO is spearheading four main activities to strengthen research and use of data for better decision-making and performance management in the agriculture sector:

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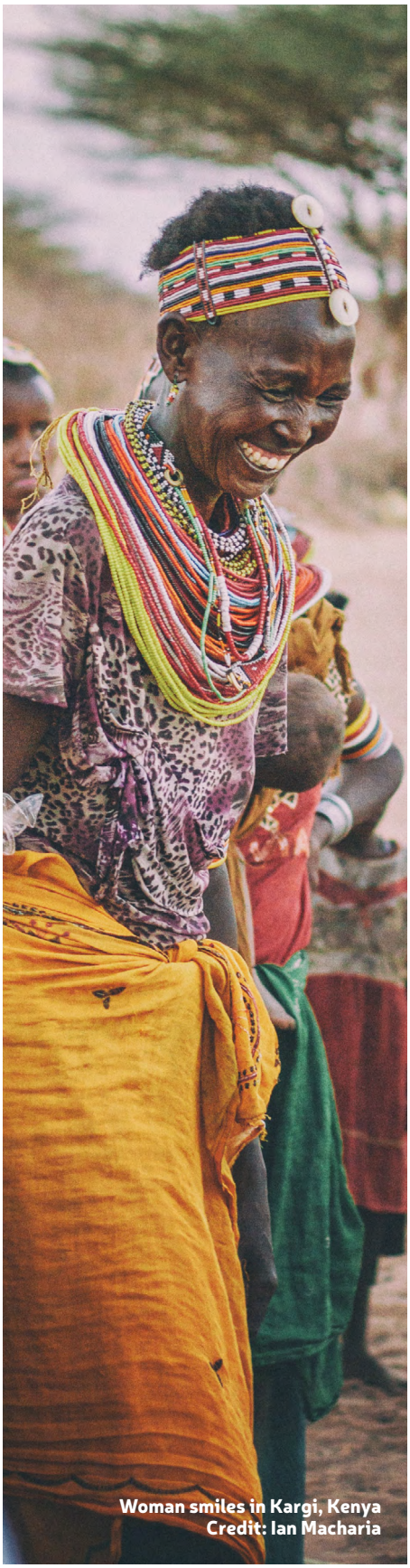
1. Digitization of existing data, research and other performance information held by MoALFC and associated agencies.
2. Creation of an enabling environment for research and innovation with clear linkages between data, research, and innovation.



Woman smiles in Kargi, Kenya
Credit: Ian Macharia

3. Defining data laws and set up open data platforms for agricultural data at national and county levels to accelerate the launch of the research and data flagship

4. Launching data use cases.

Discussions are underway with the Agriculture and Rural Development Donor Group and other partners, to build on the successes and lessons from this initiative, to enhance the Ministry's M&E capacity through the ATO in line with the ASTGS Flagships 7[2] and 8[3]. As the ATO develops a program performance dashboard to strengthen the role of M&E and use of data to improve service delivery and inform decision making, the ATO seeks to address three key challenges the sector faces to be able to realize real-time operational and strategic improvements. First, catalyzing the research and innovation space in agriculture, including around use of big data and advanced analytics (AA). Second, enabling more reliable access to useable and shareable data. And finally, demand for quality analyses to support evidence-based decisions on performance management, M&E, research, and policy.

This initiative is enough proof that Kenya's journey to transformation aboard the data revolution bus is on the right track.

[2] FLAGSHIP 7: Launch three knowledge and skills-building programmes for ~200 national and county government leaders and flagship implementers (including 1,000 farmer-facing SMEs), and establish a digitally enabled extension programme led by ~3,000 county-based youth extension agents

[3] FLAGSHIP 8: Strengthen research and innovation as launch priority digital and data use cases to better drive decision making and performance management